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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/821,913	04/12/2004	Hideki Sato	P9219.0007	2455

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EXAMINER	
SCHINDLER, DAVID M	

ART UNIT	PAPER NUMBER
2862	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/821,913	SATO ET AL.	
	Examiner	Art Unit	
	DAVID M. SCHINDLER	2862	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12/3/2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *2-8* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *2-8* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *12 April 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☒ Certified copies of the priority documents have been received in Application No. 10/052,525.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This action is in response to the communication filed 12/3/2007. In view of applicant's amendments the drawing objections of claims 10, 12, 14, and 16 are withdrawn. In view of applicant's amendments, the 35 U.S.C. 112 rejections of claims 4-6 and 9-16 are withdrawn. In view of the Double Patenting Rejection below, the previous indication of allowability of claims

Response to Arguments

2. Applicant's arguments, see pages 2-4 of the Remarks, filed 12/3/2007, with respect to the rejection(s) of claim(s) 2 and 7 under 35 U.S.C. 102(e) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of ADELERHOF et al. (WO 00/79298) with regard to claim 7, US 7,187,167 with regard to claims 2-8, and Application 11/682841 with regard to claims 2-8.

Claim Objections

3. Claims 4 and 7 are objected to because of the following informalities:

4. As to Claim 4,

5. The phrase "closed to" on line one of feature (g) is awkward. It appears this phrase should be "closer to."

6. As to Claim 7,

7. The phrase "X-axis." on line 3 of feature (c) is awkward.

8. Appropriate correction is required.

Claim Rejections - 35 USC § 102

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless -
>
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

10. Claim 7 is rejected under 35 U.S.C. 102(e) as being anticipated by ADELERHOF et al. (ADELERHOF) (WO 00/79298).

11. ADELERHOF discloses a plurality of magnetoresistance effect elements (Figure 10), each element including a spin valve film, the film including a free layer, a spacer layer and a pinned layer having a pinned magnetization direction, the element having a resistance value that changes in accordance with a relative angle formed by a magnetization direction of the pinned layer and a magnetization direction of the free layer, wherein (a) the layers of each of the magnetoresistance effect elements are successively laminated directly on a single substrate of a single chip, (b) an X-axis group (the two left most and the two

right most elements) of four of a plurality of the magnetoresistance effect elements constructs an X-axis magnetic sensor for detecting a magnetic field in an X-axis direction, and all of the magnetoresistance effect elements of the X-axis group have pinned magnetization directions of the pinned layers parallel to each other, and (c) a Y-axis group (the four top elements) of four of a plurality of magnetoresistance effect elements constructs a Y-axis magnetic sensor for detecting a magnetic field in a Y-axis direction perpendicular to the X-axis direction and all of the magnetoresistance effect elements of the Y-axis group have pinned magnetization directions of the pinned layers parallel to each other ((Figure 10) and (Page 1, Lines 9-29) and (Page 2, Lines 1-8) and (note applicant's specification, page 1, lines 20-28) and (Page 5, Lines 23-29) and (Page 13, Lines 10-17) and (Page 17, Lines 20-22)).

Double Patenting

12. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re*

Longi, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

13. Claims 2-8 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 4, 7, 8, and 11 of U.S. Patent No. 7,187,167 ('167). Although the conflicting claims are not identical, they are not patentably distinct from each other because:

14. As to Claim 2,

15. '167 discloses a magnetoresistance effect element including a spin valve film, the film including a free layer, a spacer layer (pinning layer) and a pinned layer whose magnetization direction is pinned, wherein the layers are successively laminated on a substrate of a single chip, the substrate having a rectangular shape which has two sides along an X-axis and perpendicular to the Y-axis direction and the other of the center lines is a center line of the two sides along the Y-axis and perpendicular to the X-axis, and the pinned layers of at

least two of the plurality of magnetoresistance effect elements have the pinned magnetization directions that cross each other (Claim 4).

16. As to Claim 3,

17. '167 discloses a single axis magnetic sensor by full bridge connection of the four elements, the single axis magnetic sensor being an X-axis magnetic sensor for detecting a magnetic field along the X-axis or a Y-axis magnetic sensor for detecting a magnetic field along the Y-axis, the pinned magnetization directions of the pinned layers of the four elements being parallel to each other (Claim 7).

18. As to Claim 4,

19. '167 discloses eight magnetoresistance effect elements including a first through an either element, each of the elements including a spin valve film, the film including a free layer, a spacer layer (pinning layer) and a pinned layer, the pinned layer having a pinned magnetization direction, wherein the layers are successively laminated on a substrate of a single chip, the substrate having a rectangular shape which has a left side along a Y-axis, a right side along the Y-axis, a top side along an X-axis and a bottom side along the X-axis in plan view, the X-axis and the Y-axis are perpendicular to each other, and each of the elements has a resistance value that changes in

accordance with a relative angle formed by a magnetization direction of the pinned layer and a magnetization direction of the free layer, the magnetic sensor being formed in such a manner that the magnetoresistance effect elements are provided on a single plane, (a) the first element being formed at a position closed to the left side than the right side and below a center line of the left side and the right side, the first center line being perpendicular to the Y-axis, and the first element having a pinned magnetization direction of the first element's pinned layer in a direction of the X-axis, (b) the second element being formed at a position closer to the left side than the right side and above the first center line, the second element having a pinned magnetization direction of the second element's pinned layer in the direction of the X-axis, (c) the third element being formed at a position closer to the right side than the left side and above the first center line, and the third element having a pinned magnetization direction of the third element's pinned layer in the direction of the X-axis, (d) the fourth element being formed at a position closer to the right side than the left side and below the first center line, and the fourth element having a pined magnetization direction of the fourth element's pinned layer in the direction of the X-axis, (e) the fifth element being formed at a position closer to

the top side than the bottom side and left of a second center line of the top side and the bottom side, the second center line being perpendicular to the X-axis, and the fifth element having a pinned magnetization direction of the fifth element's pinned layer in the direction of the Y-axis, (f) the sixth element being formed at a position closer to the top side than the bottom side and right of the second center line, and the sixth element having a pinned magnetization direction of the sixth element's pinned layer in the direction of the Y-axis, (g) the seventh element being formed at a position closed to the bottom side than the top side and right of the second center line, and the seventh element having a pinned magnetization direction of the seventh element's pinned layer in the direction of the Y-axis, and (h) the eighth element being formed at a position closer to the bottom side than the top side and left of the second center line, and the eighth element having a pinned magnetization direction of the eighth element's pinned layer in the direction of the Y-axis (claim 8).

20. As to Claim 5,

21. '167 discloses (a) the first to fourth elements construct an X-axis magnetic sensor for detecting a magnetic field in the direction of the X-axis by full bridge connection of the first to fourth elements, and (b) the fifth to eighth elements

construct a Y-axis magnetic sensor for detecting a magnetic field in the direction of the Y-axis by full bridge connection of the fifth to eighth elements (claim 11).

22. As to Claim 6,

23. '167 discloses (a) the pinned magnetization direction of the pinned layer of the first and second elements are in a negative of the X-axis, (b) the pinned magnetization direction of the pinned layer of the third and fourth elements are in a positive direction of the X-axis, (c) the pinned magnetization direction of the pinned layer of the fifth and the sixth elements are in a positive direction of the Y-axis, and (d) the pinned magnetization direction of the pinned layer of the seventh and eighth elements are in a negative direction of the Y-axis (claim 11).

24. As to Claim 7,

25. '167 discloses a plurality of magnetoresistance effect elements, each element including a spin valve film, the film including a free layer, a spacer layer (pinning layer) and a pinned layer having a pinned magnetization direction, the element having a resistance value that changes in accordance with a relative angle formed by a magnetization direction of the pinned layer and a magnetization direction of the free layer, wherein (a) the layers of each of the magnetoresistance effect

elements are successively laminated directly on a single substrate of a single chip, (b) an X-axis group of four of a plurality of the magnetoresistance effect elements constructs an X-axis magnetic sensor for detecting a magnetic field in an X-axis direction, and all of the magnetoresistance effect elements of the X-axis group have pinned magnetization directions of the pinned layers parallel to each other, and (c) a Y-axis group of four of a plurality of magnetoresistance effect elements constructs a Y-axis magnetic sensor for detecting a magnetic field in a Y-axis direction perpendicular to the X-axis direction and all of the magnetoresistance effect elements of the Y-axis group have pinned magnetization directions of the pinned layers parallel to each other (claim 4).

26. As to Claim 8,

27. ‘167 discloses (a) the X-axis group of magnetoresistance effect elements construct the X-axis magnetic sensor by full bridge connection, and the pinned magnetization directions of the X-axis group of magnetoresistance effect elements are in the X-axis direction, and (b) the Y-axis group of magnetoresistance effect elements construct the Y-axis magnetic sensor by full bridge connection, and the pinned magnetization directions of the Y-axis group of magnetoresistance effect elements are in the Y-axis direction (claim 11).

28. Claims 2-8 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-4 of copending Application No. 11/682841 ('841). Although the conflicting claims are not identical, they are not patentably distinct from each other because:

29. As to Claim 2,

30. '841 discloses a magnetoresistance effect element including a spin valve film, the film including a free layer, a spacer layer and a pinned layer whose magnetization direction is pinned, wherein the layers are successively laminated on a substrate of a single chip, the substrate having a rectangular shape which has two sides along an X-axis and perpendicular to the Y-axis direction and the other of the center lines is a center line of the two sides along the Y-axis and perpendicular to the X-axis, and the pinned layers of at least two of the plurality of magnetoresistance effect elements have the pinned magnetization directions that cross each other (Claim 1).

31. As to Claim 3,

32. '841 discloses a single axis magnetic sensor by full bridge connection of the four elements, the single axis magnetic sensor being an X-axis magnetic sensor for detecting a magnetic field

along the X-axis or a Y-axis magnetic sensor for detecting a magnetic field along the Y-axis, the pinned magnetization directions of the pinned layers of the four elements being parallel to each other (Claim 1).

33. As to Claim 4,

34. '841 discloses eight magnetoresistance effect elements including a first through an either element, each of the elements including a spin valve film, the film including a free layer, a spacer layer and a pinned layer, the pinned layer having a pinned magnetization direction, wherein the layers are successively laminated on a substrate of a single chip, the substrate having a rectangular shape which has a left side along a Y-axis, a right side along the Y-axis, a top side along an X-axis and a bottom side along the X-axis in plan view, the X-axis and the Y-axis are perpendicular to each other, and each of the elements has a resistance value that changes in accordance with a relative angle formed by a magnetization direction of the pinned layer and a magnetization direction of the free layer, the magnetic sensor being formed in such a manner that the magnetoresistance effect elements are provided on a single plane, (a) the first element being formed at a position closed to the left side than the right side and below a center line of the left side and the right side, the first center line being

perpendicular to the Y-axis, and the first element having a pinned magnetization direction of the first element's pinned layer in a direction of the X-axis, (b) the second element being formed at a position closer to the left side than the right side and above the first center line, the second element having a pinned magnetization direction of the second element's pinned layer in the direction of the X-axis, (c) the third element being formed at a position closer to the right side than the left side and above the first center line, and the third element having a pinned magnetization direction of the third element's pinned layer in the direction of the X-axis, (d) the fourth element being formed at a position closer to the right side than the left side and below the first center line, and the fourth element having a pined magnetization direction of the fourth element's pinned layer in the direction of the X-axis, (e) the fifth element being formed at a position closer to the top side than the bottom side and left of a second center line of the top side and the bottom side, the second center line being perpendicular to the X-axis, and the fifth element having a pinned magnetization direction of the fifth element's pinned layer in the direction of the Y-axis, (f) the sixth element being formed at a position closer to the top side than the bottom side and right of the second center line, and the sixth

element having a pinned magnetization direction of the sixth element's pinned layer in the direction of the Y-axis, (g) the seventh element being formed at a position closed to the bottom side than the top side and right of the second center line, and the seventh element having a pinned magnetization direction of the seventh element's pinned layer in the direction of the Y-axis, and (h) the eighth element being formed at a position closer to the bottom side than the top side and left of the second center line, and the eighth element having a pinned magnetization direction of the eighth element's pinned layer in the direction of the Y-axis (claim 2).

35. As to Claim 5,

36. '841 discloses (a) the first to fourth elements construct an X-axis magnetic sensor for detecting a magnetic field in the direction of the X-axis by full bridge connection of the first to fourth elements, and (b) the fifth to eighth elements construct a Y-axis magnetic sensor for detecting a magnetic field in the direction of the Y-axis by full bridge connection of the fifth to eighth elements (claim 2).

37. As to Claim 6,

38. '167 discloses (a) the pinned magnetization direction of the pinned layer of the first and second elements are in a negative of the X-axis, (b) the pinned magnetization direction

of the pinned layer of the third and fourth elements are in a positive direction of the X-axis, (c) the pinned magnetization direction of the pinned layer of the fifth and the sixth elements are in a positive direction of the Y-axis, and (d) the pinned magnetization direction of the pinned layer of the seventh and eighth elements are in a negative direction of the Y-axis (claim 3).

39. As to Claim 7,

40. '841 discloses a plurality of magnetoresistance effect elements, each element including a spin valve film, the film including a free layer, a spacer layer and a pinned layer having a pinned magnetization direction, the element having a resistance value that changes in accordance with a relative angle formed by a magnetization direction of the pinned layer and a magnetization direction of the free layer, wherein (a) the layers of each of the magnetoresistance effect elements are successively laminated directly on a single substrate of a single chip, (b) an X-axis group of four of a plurality of the magnetoresistance effect elements constructs an X-axis magnetic sensor for detecting a magnetic field in an X-axis direction, and all of the magnetoresistance effect elements of the X-axis group have pinned magnetization directions of the pinned layers parallel to each other, and (c) a Y-axis group of four of a

plurality of magnetoresistance effect elements constructs a Y-axis magnetic sensor for detecting a magnetic field in a Y-axis direction perpendicular to the X-axis direction and all of the magnetoresistance effect elements of the Y-axis group have pinned magnetization directions of the pinned layers parallel to each other (claim 4).

41. As to Claim 8,

42. '841 discloses (a) the X-axis group of magnetoresistance effect elements construct the X-axis magnetic sensor by full bridge connection, and the pinned magnetization directions of the X-axis group of magnetoresistance effect elements are in the X-axis direction, and (b) the Y-axis group of magnetoresistance effect elements construct the Y-axis magnetic sensor by full bridge connection, and the pinned magnetization directions of the Y-axis group of magnetoresistance effect elements are in the Y-axis direction (claim 4).

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DAVID M.

SCHINDLER whose telephone number is (571)272-2112. The examiner can normally be reached on Monday-Friday (8:00AM-5:00PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Assouad can be reached on (571) 272-2210. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

David M. Schindler
Examiner

Art Unit 2862

DMS

/Reena Aurora/
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